Problem 3.44: Why Op-Amps are Useful

The circuit (Figure 3.85) of a cascade of op-amp circuits illustrate the reason why op-amp realizations of transfer functions are so useful.

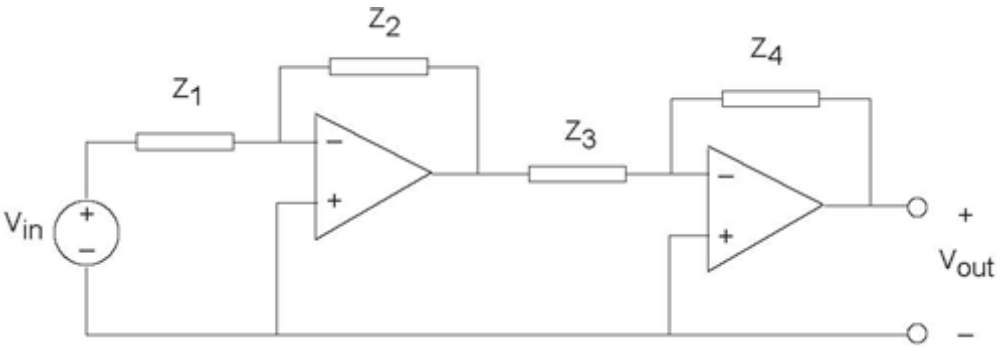

Figure 3.85 Why Op-Amps are Useful

1. Find the transfer function relating the complex amplitude of the voltage V_{out} (t) to the source. Show that this transfer function equals the product of each stage's transfer function.
2. What is the load impedance appearing across the first op-amp's output?
3. Figure 3.84 illustrates that sometimes "designs" can go wrong. Find the transfer function for this op-amp circuit (Figure 3.86), and then show that it can't work! Why can't it?

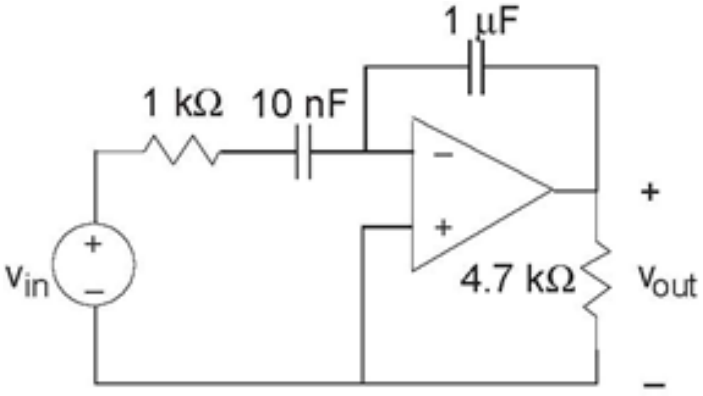

Figure 3.86 op-amp circuit